

Vol. 7

TAMPA, FLORIDA, AUGUST, 1926

No. 8

The Relationship Between the Producers and Consumers of Citrus Fruits

By F. L. Skelly, Manager American Fruit Growers Inc., Orlando, Fla.

Modern life has become so intricate; business activities are so complex; the facilities for supplying our needs are so numerous and yet apparently so natural and easy in their operation; and commodities are laid at our doors as it were, in such profusion and variety and with so little necessity for effort on our own part, other than in the payment for same, that the average man gives but little thought to certain principles underlying modern production and merchandising, or to the real relationship which exists between him and the ultimate consumer of his own products or to the producer of the things which he consumes, as the case may be.

These very complexities, which are the natural and necessary result of the development of transportation facilities and other modern conditions which have brought about a centralization of production in large volume for widespread consumption in distant localities, and which have eliminated almost entirely any direct personal contact between the producer and the consumer, have developed in most of us a habit of accepting conditions as we find them, as if they existed merely as a matter of course, and have had a tendency to crowd out of our minds a consciousness of certain fundamental principles which



F. L. Skelly

nevertheless constantly operate.

Analysis is at times very profitable. If it can bring about a correct

understanding of our true relationship to others it stimulates our personal interest and gives us, in a way, a better command of the situation by revealing what is necessary for us to do for the enhancement of our own fortunes. This is particularly true and important with respect to the production of perishable products.

For years there has existed on both sides, a very prevalent attitude that the producer and the consumer of perishable products stand on opposite sides of the fence. Any such idea of antagonism of interests is a mistaken attitude. As a matter of fact the interest of the producer and consumer are strictly mutual.

The relationship between the two is one of absolute interdependence. Obviously the great mass of consumers afford the only market outlet which the producer has. Conversely, the producer constitutes the only source of supply for the consumer's needs. The business of the producer, using the term in the aggregate, is to furnish a consistent and ample supply of products to meet the life necessities and desires of the great body of consumers; and these consumer necessities and desires should in turn afford a similarly consistent and attractive market for this mass production.

Citrus Industry & Trade

This should result to the mutual advantage of both and involves a recognition on the part of each of certain fundamentals with respect to the other. The consumer should remember that he must pay, on an average, a price which will leave to the producer a reasonable margin of profit on his labor and investment; otherwise the business of production will not be sufficiently attractive to induce the production of sufficient supplies to make it possible for the consumer to purchase at a reasonable price. On the other hand, there is an obligation on the part of the producer, not merely as a matter of fairness but from the standpoint of his own best interests, to recognize that the consumer is entitled to receive full value in the product he buys, and that otherwise the producer cannot develop the consistent market and expand his outlet to take care of his constantly increasing production with any reasonable assurance of satisfactory profit.

In other words, the best ultimate interests of both are served by a correct mutual understanding and recognition of the rights of each; and certainly one of the greatest, if not in fact the greatest problem before the perishable industry today is to bring about such a situation, and by proper methods to put these governing principles of successful production and merchandising into operation, stimulating the confidence of the producer in his market through the results obtained by stimulating a consistent confidence of the consumer in the product he purchases.

We in Florida, being on the producing end, may well study the means by which this may be brought about. First, and of primary importance, is the matter of quality in the product. By this I mean not merely inherent quality or flavor in the fruit, but proper handling and packing for its preservation and presentation to the consumer in attractive form, so as to insure at all times, as far as it is honestly and reasonably possible to do, that the consumer will receive full value in his purchase and will meet with complete satisfaction rather than dissatisfaction therein.

The importance of this is now recognized in all lines of merchandising but the thing that really counts is the extent to which it is consistently put into actual practice. It is perhaps in some respects more difficult of accomplishment in the handling of perishable products than in the general run of non-perishable manufactured goods, but the very fact of this greater difficulty of accomplishment, which in itself is the result of the perishable nature of these pro-

ducts, necessitates and justifies the greater effort for its achievement. It is an axiom that, "the best salesman is a satisfied customer", and this is the best possible manner of stabilizing and expanding one's market.

We as producers must recognize that in any crop of fruit there will be some percentage of inferiority and we should bring ourselves to a willingness to put inferior fruit in its proper classification and not force it upon an unsuspecting public in whom we are attempting to develop a confidence in our production. There are times when the poorer grades may be disposed of to advantage but they should in all cases be sold strictly on their merits and should never be permitted by misrepresentation, either directly or indirectly, to undermine the confidence of the consumer.

In fact, under normal conditions for the best aggregate results, the inferior grades should never be unloaded on the markets. Secretary of Agriculture Jardine brought out this point in an address before the Orlando and Orange County Chambers of Commerce at Orlando during his visit to Florida a few months ago. He emphasized the importance of the producer's getting a correct understanding of the consumers position and needs and pointed out to Florida growers of both citrus and vegetable products that if they would hope for permanent financial success they must learn to cull out the inferior grades; to carefully standardize their better fruit, and ship to the markets of the north nothing below a No. 1 grade.

The lower grades and the culls will not on the average sell in the markets for enough to pay their way in freight and packing, and normally serve only to disorganize the markets and create dissatisfaction.

The constant aim of the producer therefore, should be to give satisfaction to the consumer; and this effort on the producer's part should be fully understood, supplemented and rendered effective by efficient efforts to the same end on the part of the necessary intermediaries for the delivery of the products to the consumer and their sale to him.

The merits of the particular products should be properly presented to the consumer's mind to stimulate a desire on his part and develop the largest possible consumer demand. This demand having once been created, it is important that there be available at all times sufficient supplies to meet it, and it is equally important that in creating this demand some definite and satisfactory means be provided whereby the consumer

may with assurance and ease identify his purchase.

Herein lies the importance to the producer of a trademarked product. The value of the trademark is so well recognized as to hardly need detailed comment but I may be pardoned for quoting a summary by Morris S. Wise, one of America's foremost authorities on trademarks, as to the use and value of the trademark in modern merchandising. Mr Wise says:

"Introduction of the trademark into commercial use was natural and, when once effected, rapidly became a trade necessity.

"Not only does the trademark indicate the source of origin of the goods to which it is attached, but it also guarantees or assures the purchaser, whether an intermediate or an ultimate one, that the honest skill of the owner of the trademark, the good quality of the goods, the carefulness of selection, purity of ingredients, or correctness of weight or measure, are to be found in the articles to which such mark is affixed.

"Examination of the evolution and development of the trade mark is substantially an examination of the evolution and development of the vast commerce of our country."

The above quotation well summarizes the situation, and when the products as presented to the consumer are properly standardized a well advertised trademark is of tremendous value in the sale of perishables. It is, however, of utmost importance that the standard be set high and maintained with greatest care.

Good judgment should be used in the disposition of the crop as a whole throughout the season. The utmost care and good faith should be exercised to insure that no fruit be offered to the consumer until it is fully matured. If this is done, the product itself stimulates the demand for it, but even a moderate quantity of immature citrus fruits scattered throughout the markets of the country early in the season will do tremendous harm.

For successful merchandising on a large scale it is essential that a supply adequate to the needs of the consuming public be consistently maintained. No place should be given to any idea of successful marketing by attempted arbitrary regulation of prices by withholding shipments. The attempt should be to keep the crop moving consistently throughout the season in such volume as the markets will take at a reasonable return to the producer, so as to keep a fresh supply of the product always

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Lyons Estimates Crop At 15,500,000 Boxes

According to C. W. (Joe) Lyons, head of the Lyons Fertilizer Co., of Tampa, Florida citrus growers may expect a maximum commercial crop of 15,500,000 boxes for the coming season. Mr. Lyons' estimate, issued on August first, is much below the early estimates of some growers and shippers who based their estimate entirely upon the heavy spring bloom without taking account of the later very heavy droppage. In connection with Mr. Lyons' estimate it is well to remember that his estimate of the 1925-26 crop was by far the most accurate of all the early estimates of a year ago.

Every summer, around August 1, Mr. Lyons, whose business brings him into close touch with growers, issues an estimate of the forthcoming crop. In figuring on 15,500,000 boxes Mr. Lyons says he has taken everything bearing on the yield into consideration.

With a comparatively small crop, Mr. Lyons declares fruit should "bring splendid returns to the growers this year," for after all there is only one Florida producing the variety which stands in a class by itself.

Estimates Vary

"Various estimates have been made so far this season with reference to the amount of fruit that will be shipped from Florida during the 1926-27 season," said Mr. Lyons in a statement. "There was a statement very early in the season to the effect that the crop this year would be 20,000,000 boxes. I am sure that, from a revised estimate, certainly the one that predicted the crop of citrus fruit of this size would be willing to admit that he was in error. According to the information I have been able to gather, and from the very careful survey from different parts of the state, I am placing the number of boxes to be shipped this year at 15,500,000. My estimate is for the commercial crop of fruit that we expect to ship.

"There was a very heavy bloom on the trees this spring, but a great quantity of it did not stick, and the result is that some of the trees that bloomed the heaviest are now showing just a normal crop of fruit. Furthermore, out of this entire amount of fruit estimated we will have our usual dropping and culls. And all these items being considered, in my



C. W. Lyons

opinion this is a fair estimate of the amount of fruit now on the trees.

Late Bloom Negligible

"I have not taken into consideration the late grapefruit bloom that there has been, but in my opinion this will have very little effect on the early crop for the reason that this May or June bloom will not come into the market until the earlier fruit has been exhausted, but which will compete with Valencia oranges and Marsh Seedless grapefruit, and from past experience, these varieties always bring a very high price late in the season.

"The time is at hand now when concerted action must be taken by the growers of the state with reference to the size of the crop of fruit each year. In other words, we appreciate the business that our various marketing agencies do with the northern buyers, but under no circumstances must we allow these buyers to estimate or put forth propaganda with reference to the size of our crop of fruit.

Should Bring Big Price

"Considering the crop of 15,500,000 boxes, it is comparatively small, and there is no question but what fruit should bring splendid returns to

the growers this year; because after all, there is just one Florida fruit, and the rest of the country is fast learning of the superior quality of our oranges and grapefruit. The splendid outlook for the citrus industry is just one more evidence of some of the wonderful resources of the state of Florida. And to think that from this crop alone somewhere in the neighborhood of \$50,000,000 should be returned for distribution among the growers and shippers of this state.

"I can not at this time refrain from saying a word or two as to the prospects for canning grapefruit and bottling orange juice. Unless one keeps up with this data from season to season, it is hard to realize the great amount of experimental work, and in addition, the thousands of cans of grapefruit that actually leave Florida for northern markets each year. The splendid efforts put forth by the Florida Citrus Exchange has undoubtedly stimulated and created a demand for pure orange juice; and it is my opinion that within a very few years entire crops of fruit will be sold complete for canning purposes. And when this time arrives the citrus growers of the state of Florida will certainly have a corner on the market, for the reason that no other grapefruit or orange grown elsewhere can compare with them for canning purposes, on account of juice content."

MAMMOTH GROVE MAKES CONTRACT

E. C. Mason, vice-president and general manager of the Mammoth Grove Company at Lake Wales, announces that he has closed a contract with W. H. Mouser & Co., of Orlando to act as marketing agents for the fruit of Mammoth Groves for the season of 1926-27. A packing plant with a capacity of six cars per day is being erected at Mammoth Groves to care for the increasing production of these young groves. It is estimated that the 2200 acres now just coming into bearing will produce 75,000 boxes this season, and that within a few years the production will be 500,000 boxes annually.

Good woodlands help get a loan on the farm.

CITRUS COMMENTS

BY

**R. E. Lenfest, Manager Horticultural Department
Orange County Citrus Sub-Exchange, Orlando**

Summer Pruning

After the summer application of fertilizer has been applied and the spraying that is to be done has been finished there is a period when a certain amount of pruning can be done without interfering with the other work. The main consideration in any job of pruning should be the removal of all the larger dead wood and as much of the smaller dead wood as you can afford to remove. It takes time to cut out the small dead twigs and since it is impossible or nearly so to take out every little twig that is dead the pruning of the dead wood must stop at the point where the cost becomes too great. The cost of removing the larger dead wood is not great but tests have shown that the taking out of all the small dead stuff will require a good many hours per tree. The principal good secured from the removal of dead wood is the reducing of the melanose infection and after the main part of the dead wood has been taken out the melanose situation can be handled by the use of bordeaux oil in April or very early May.

In making the pruning cuts they should all be made very close to the main trunk or branch from which the wood is being removed. It costs no more to make a good cut than it does to make a poor one. The main difference is that the man doing the pruning must use his head all the time instead of none of the time. In removing any large branches a little care must be used in order not to damage the rest of the tree and also to make a good cut. It will take several cuts to make a good job. The first should be at a little distance from the point where the final cut is to be made and should be on the under side of the branch. The next cut should be on the top of the branch and at a point an inch or more farther out on the limb. The first cut from the under side should be cut through till the saw begins to bind and then the second cut can be made. The purpose of these two cuts is to keep the falling branch from splitting the wood or

stripping the bark from the part that is to be left. The next step is to make the final cut just as close to the tree as possible. This may seem to leave a large space to heal over but it will cover over quicker than one that is left with a long stub. The healing growth of the bark is from the sides of the cut more than from the top or bottom. If you will make some measurements you will find that a very close cut has not widened the distance to be healed a great deal even though the length of the cut up and down may be several times greater than the length of one not made so closely.

It is a good plan to cover the surface of the larger pruning wounds with some protective coating. The main purpose of this is to protect the exposed wood so as to keep it from checking and cracking and thus allowing decay to start. Any good paint, not too expensive will be all right for this work. Some growers desire to use some disinfectant on the pruning cuts. For those who wish to do this a little carbolineum may be used to thin out the paint and thus furnish the disinfecting coating as well as one to prevent cracking of the wood. Other disinfectants may be mixed with the paint and will give good results. It is not necessary to spend money for some highly advertised product with many claims when something of the above nature will do just as well and some times better and cost much less.

Remember that all pruning cuts must be made well back into the live wood in order to prevent further dying back of the wood.

Another very important thing to keep in mind is the following. Whenever trees or groves are in a badly run down condition, especially from neglect and there is a great deal of dead wood the best plan to follow is to do no pruning at all until the trees have been brought into a condition where they have a good vigorous new growth and show plenty of life and vigor. To prune a very weak tree and remove all the dead wood, making all the cuts well back into the live wood generally means

more dead wood and a still smaller tree. It seems that it takes a great deal of strength from these weak trees to heal over the many pruning wounds and thus they do not seem able to put out much growth after the pruning. Hence the advisability of getting the trees into a more vigorous condition before a pruning.

If the season will permit give the trees a good application of castor pomace in addition to a regular application of fertilizer. Then begin frequent and regular but shallow cultivation. The trees will look pretty rough for some time, then they will put out a growth and as soon as they are vigorous enough the pruning can be done and the change in the looks of the grove will be immediate and will show a big improvement.

Keep the pruning tools sharp.

Off Color Trees

Any trees that are not up to the color that they should carry should have special attention now. Give them a little extra fertilizer and also cut the cover crop in that block or around those trees so as to give them the benefit of all the food in the ground. This will be sort of an extra feeding between the summer and the fall applications and is for the purpose of keeping the trees from getting too run down.

Young Trees

By this time you should begin to figure on the fall fertilizer for the young trees which should generally be applied the last of August or during September. The cultivation should continue right up to the time that the fall fertilizer is put on and worked in. Be sure to keep a sharp look out for scales on the young trees, especially on the young tangerines for often the unthrifty trees in the young groves are due to severe infestations of scales.

If the cultivation does not keep the grass away from the trees then this should be done by hoeing. Do as much of the cultivating as you can by careful team work and then finish the rest by hand. When hoeing is done the soil should be left loose

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Gypsum Improves Soil Texture and Supplies Plant Food

By Professor George A. Olson

One of the coming big uses for gypsum on the farm will be as a soil improver, since it mellows the clay type of soil and compacts the sandy type. It has already been found to be most valuable as a means of opening up the heavy subsoils. These improvements are essential no matter how fertile the lands may be. Even soils which contain organic matter are benefited because with the humus there is present much clay, clay and sand, or sand.

As a matter of fact all soils which bake and become hard are improved with gypsum. Its importance as a soil improver is more noticeable in the dry summer period than in the spring when abundance of water alone keeps the particles of soil sticking together. During the drier period the particles of soil cement together. This undesirable soil condition becomes more pronounced as the organic matter wastes away. At the same time the calcium disappears from the soil.

Cementing is due to particles of like nature coming in close contact. The separated clay particles interlock to form firm compact masses. Organic matter tends to keep the particles from shifting about and moving together. The organic matter is most effective when it is filled like a sponge with water. Calcium in solution becomes a film around each clay particle which after crystallization serves as a stone barrier. Wherever this condition exists there is no interlocking of the soil particles. Instead the clay particles congregate into groups. The soil thereby becomes porous and air and moisture are permitted to move freely in the open spaces.

Particles of sand in the very sandy type of soils move about as strangers. In this respect they differ from particles of clay which are friendly to one another. Water, as in the case of organic matter containing moisture, holds the sand particles close together. In sandy soils calcium serves as the cement which holds the particles of sand in place.

Calcium therefore is essential in keeping clay soils mellow and sandy soils firm. The most desirable form

of calcium is gypsum (calcium sulphate) because the calcium in this substance is one hundred times more soluble than calcium in limestone. Owing to this favorable degree of solubility gypsum quickly becomes a part of the soil solution while other forms of calcium remain on the surface of the soil undissolved. Mixed with the soil its action is hastened. The difference in rate of solubility in favor of gypsum is important since it helps to make the calcium films around the clay particles and serves to hold the sand particles close together.

Besides the good effects of the gypsum which have been mentioned there is sulphate sulphur supplied which is a most valuable plant food. This form of sulphur enters the plants and combines with nitrogen to form the vital substance of the cell plasma and the most valuable substances in grains and other seeds. In many instances the potash contained in the soil is liberated for plant needs.

Plant foods however are of little value if the soil is physically poor. The soil must be mellow and be easy to work. It must be open enough to permit the free movement of air and moisture. It must be suitable for the growth of desirable organisms which aid the farmer to produce maximum crops. In fact soils may be low in essential plant food yet if they are calcareous in nature (contain much calcium) or are amply treated with calcium big crop yields will result.

We frequently comment on the high productivity obtained on European soils. We overlook the fact that England, France, Belgium and most of western European soils are calcareous in nature. Soils of the type found in the long-leaf and short-leaf pine regions of the United States are low in calcium. Similar lands found in northern Germany have long remained almost uncultivated.

It is indeed a fact that both our ancient and present civilizations have inhabited and cultivated the lands which are of calcareous nature. Calcium tones the blood, keeps the heart in rhythm and furnishes sub-

stance for the skeleton. Without the calcium, so instrumental in keeping the soils mellow, there would not be the substratum for mental culture and progress. Populations would starve and all forms of life would vanish.

ASK THE COUNTY AGENT

Scab and scale and bugs galore
On the citrus ever more,

Ask the county agent.

Bugs on cabbage thick as fleas,
Weevils getting beans and peas,

Ask the county agent.

Cukes are rotting on the vine,
Melons falling into line,

Ask the county agent.

Cotton has weevils, oats have rust,
Corn has smut enough to disgust,

Cats have fleas and chickens roup
Hogs have lice and children croup,

Ask the county agent.

Calf won't grow and mule colt died,
How to skin and save a hide,

Ask the county agent.

How to build a dairy barn.

Where to buy pure Simon yarn,

Ask the county agent.

Price of truck has hit the spin,
You don't want to lose again,

Ask the county agent.

How to kill a pesky pest,

How to cultivate the best,

Ask the county agent.

When to plant or where to sell,
County agent will tell you well,

Ask the County agent.

—J. Francis Cooper.

CITRUS COMMENTS

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and well stirred to a shallow depth around the young trees and not just pulled away from the trees leaving a smooth hard surface to become caked and which will allow a great deal of moisture to evaporate.

It is alright to burn forest products when they are needed for fuel, but foolish to waste such good material for fuel and other uses through forest fires.

Don't keep livestock just because they are purebred. There may be some scrub purebreds.

The Citrus Industry

Exclusive publication of the Citrus Growers and Shippers

Address all communications to the Main Office
415 Stevall-Nelson Building
Tampa, Florida.

Telephone _____ 4819

S. L. FRISBIE, Editor and Manager

R. D. RAINEY _____ Advertising Manager

A. G. MANN _____ Production Manager

Published Monthly by
Associated Publications Corporation
Tampa, Florida.

Subscription, \$1.00 per year in advance

Entered as second-class matter February 16, 1920, at the post-office at Tampa, Florida under the act of March 3, 1879.

Branch office and production plant, Bartow, Florida.

GROVE CALENDAR FOR AUGUST

Timely Suggestions for Grove Work

Prune out dead wood and water sprouts. Avoid heavy pruning of branches at all times.

Cover all large cuts with coat of warm grafting wax.

Get sprayer in good order for next month's work.

Spread the grown fungus of white fly.

Make plans for fall and winter grove planting.

Continue spraying pecans for scab control.

THE COMING CROP

The Citrus Industry prints elsewhere in this issue a preliminary estimate of the 1926-27 commercial citrus crop just made public by C. W. Lyons, head of the Lyons Fertilizer Company of Tampa. Mr. Lyons places the yield of all citrus available for shipment during the coming season at 15,500,000 boxes, including oranges, grapefruit and tangerines.

While The Citrus Industry believes that it is entirely too early to make an accurate estimate of the crop, it desires to call attention to the fact that the early estimate made by Mr. Lyons last year was by far the most accurate of any of the early estimates. As a matter of fact, his August estimate last year missed the actual number of boxes shipped out of the state by a narrow margin.

If Mr. Lyons' estimate of fifteen and one-half million boxes is anywhere near correct, and his past estimates are of a character to give his present estimate credence, the grower may look forward to another season of good prices. If the crop is no larger than Mr. Lyons' esti-

mate, the supply will again be below the demand and high prices may be expected to prevail.

Whatever the final developments may be in regard to the size of the coming crop, it is certain that the numerous estimates of an abnormal crop, made immediately following the excessively heavy bloom, have been greatly modified by later developments and an excessive droppage of both bloom and fruit. We believe that it is the part of wisdom for the grower to hold his fruit for good prices, which present conditions appear to indicate will be realized.

WHAT HAPPENED?

"What happened in Florida in 1925," asks the Homosassa Herald. Then it proceeds to answer its own question, in this fashion:

300,000 new residents joined 1,000,000 Floridians and established permanent homes

and
built approximately 10,000 new buildings of \$400,000,000 value, increased the banking resources \$500,000,000

and
produced and marketed \$120,000,000 farm and fruit crops,

and
made and sold \$200,000,000 of Florida manufactured products,

and
invested \$50,000,000 in new railroad extensions,

and
expended or appropriated \$42,000,000 in ports and waterways,

and
wrote "Finis" on real estate margin trading,

and
took a hitch in their belts, bowed their backs

and
started to solidify, stabilize and make permanent their beloved "Land of Enchantment."

So, in spite of the frequent remarks that 1925 proved to be a bad year for Florida, on account of real estate speculation and feverish conditions, it appears that Florida did do a great deal of good work in that memorable year.

Satsumaland in West Florida and the Rio Grande valley of Texas are two citrus sections just coming into prominence which older citrus sections will do well to watch. These two youngsters give promise of becoming important factors in the citrus world.

Lacking that million dollar advertising fund, we must make Florida citrus fruits look like a million dollars.

Citrus plantings properly made on the proper kind of soil with the proper kind of nursery stock and properly cared for by the proper kind of man, will return a proper profit to the grower.

British Imports of Grapefruit

In a report received in the Department of Commerce from K. A. H. Egerton, of the American Consulate General, London, England, it is stated that imports of grapefruit into the United Kingdom continue to increase, so far as can be judged by the figures for the Port of London. During the first four months of 1924 imports amounted to 9,376 hundredweight; in 1925, for the first four months, 22,889 hundredweights; and for the first four months of 1926 imports of grapefruit reached 25,051 hundredweights. (An English hundredweight equals 112 pounds, or approximately 1.44 boxes of 78 pounds.) Imports from the United States during the same four-month period have increased from 6,786 hundredweights in 1924 to 20,482 hundredweights in 1925 to 22,126 hundredweights in 1926.

A table submitted by Mr. Egerton shows the following imports of grapefruit into the Port of London (England) for the full years 1924 and 1925 and the first four months of 1926.

Imports of Grapefruit into London (England)

Origin	1924 (Cwt.)	1925 (Cwt.)	1926 (Cwt.)
United States	21,478	44,157	22,126
South Africa	2,815	6,041	-----
British W. I.	2,345	4,041	1,544
Porto Rico	502	1,326	-----
Cuba	140	687	1,286
Portuguese E.	-----	-----	-----
Africa	320	69	-----
Azores	1,050	-----	-----
Others	1,538	286	95
Total	30,189	56,607	25,051

(1) 1926 figures for first four months—January to April, inclusive. Above figures are in hundredweights. British hundredweight equals 112 pounds which is equivalent to approximately 1.44 boxes of grapefruit of 78 pounds each; to convert above hundredweights into approximate number of boxes of grapefruit, multiply by 1.5.

The following table showing imports of grapefruit into London by months, from the United States, may prove of interest as showing seasonal trend.

Imports of Grapefruit into London From the United States, by Months

1924	Cwt. (1)
January	151
February	281
March	1,400
April	4,954
May	617
June	629
July	1,009
August	315
September	936
October	876
November	2,769
December	4,542
1925	Cwt.
January	1,560
February	6,906
March	9,328
April	2,898
May	4,283
June	4,133
July	959
August	524
September	2,464
October	3,444
November	3,451
December	4,407
1926	Cwt.
January	2,685
February	6,678
March	8,519
April	4,244

(1) Above figures given in hundredweights. British hundredweight equals 112 pounds, which is equivalent to approximately 1.44 boxes of grapefruit of 78 pounds each; to convert above hundredweights into boxes of grapefruit, multiply by 1.5.

While the above figures refer to imports of grapefruit into London, the latest figures available, states Mr. Egerton, show total imports of grapefruit into the United Kingdom in 1924 as 81,367 hundredweight, of which 30,189 hundredweight came through the Port of London, the remainder being distributed among other British ports. Total imports of grapefruit from the United States to all ports of the United Kingdom in 1924 amounted to 58,556 hundredweight, of which 21,479 hundredweight came through the Port of London.

The extraordinary increase in imports of grapefruit in the United Kingdom, since 1920 is apparently continuing, concludes Mr. Egerton, though the rate of increase has apparently somewhat slackened.

SAYS COLLEGE-TRAINED FARM BOYS AND GIRLS NEED OF AGRICULTURE

More farm boys and girls in college. This is an integral part of any sound program for the permanent betterment of agriculture, W. M. Jardine, Secretary of Agriculture, asserted in a statement recently.

"Agriculture grows more complex every year," said Secretary Jardine. "It needs trained men and women to meet its problems. The same thing is true of every other field of work. America is calling constantly for leadership in every line—and leadership comes mainly from the ranks of college men and women.

"The enrollment in agricultural courses diminished 26 per cent from 1914-15 to 1925-26. First there was the war, which drew vast numbers of young men into the army and into essential industries. Then the period of post-war prosperity made many hesitate to leave money-making work. The agricultural depression shortly thereafter produced a general tendency away from preparation for farming.

"Agricultural enrollments in colleges have begun to come back. There were few more freshmen last year than the year before. Now is the time, in my estimation, to study agriculture. There are opportunities for trained young men.

"Doubtless there are some who do not agree with me as to these opportunities. This disagreement need not interfere with the plans of all farm boys and girls who can, to go to college. One of the unfortunate facts, brought out by investigations, is not only that the enrollment in agriculture has fallen but that the enrollment of country boys and girls in all courses has dropped. The cities and towns are furnishing college and university enrollments. This is not a healthy situation. Country boys and girls are entitled to as good training as city boys and girls. Moreover, the Nation needs the wholesome

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Chinch Bug Control on St. Augustine Grass

By A. H. Beyer, Assistant Entomologist, Experiment Station

The chinch bug was first recorded in the United States as an economic pest about the year 1783 in Orange County, North Carolina where it threatened the crops in that section of the south. From this outbreak the infestation has spread each year until it covers practically the eastern half of the United States, including the Mississippi Valley, with scattering outbreaks throughout the western states.

Generally speaking the chinch bug attacks only plants of the grass family, while such crops as clover, cowpeas, peas, beans, potatoes, beets, sunflowers and rape are immune, or practically so, to injury from this pest. This insect has created widespread attention among landscape gardeners, civic improvement societies, and all residents of Florida who have to do with the keeping up of lawns, because of its attack on St. Augustine grass which has been generally adopted as a lawn grass over the entire state. Because it is native to the coast from North Carolina southward to Florida, growing especially well on alluvial and muck soils, this grass is cultivated in the coast states. The scientific name is *Stenotaphrum secundatum* Walt. Lawns of this grass have a coarse texture but are otherwise satisfactory. The grass is propagated by setting out cuttings or pieces of stolens bearing shoots. The plant has a peculiar structure which consists of rather broad and short obtuse blades lapping over both sides of the stem, commencing with the axis and extending along the stem about an inch and a half. This has been observed in the writer's studies to be the point of attack made by the chinch bug upon the grass.

How the Chinch Bug Injures the Grass

The chinch bug feeds on the growing grass throughout its entire life. It is armed with a four jointed beak equipped with lancelets for piercing the plant and causing a flow of sap which is sucked into the stomach. The insect, especially in the immature stages, implants itself under the laterals of the close fitting leaves, and in its feeding imparts a reddish stain to the plant parts attacked, and causes the death of the cells. The feeding of a large number of bugs on the growing plants, as can be

seen, prevents normal growth and brings about a dwarfed condition of the plants, causing many of them to die and giving the appearance of brownish or deadened spots in the lawn, while serious outbreaks often threaten the destruction of the entire lawn.

The chinch bug thrives best when the plants are most tender and succulent, usually during the winter months, including the late fall and spring.

How to Know The Chinch Bug

The easiest way for the layman to distinguish the chinch bug is by its disagreeable odor. The full grown or adult insect has two forms, one having short wings which reach only one-half to two-thirds of the length of the abdomen, and the other having long wings which reach almost to the tip of the abdomen. Both forms are white immediately after the skin is shed from the previous stage, but they soon become black. The upper wings are whitish at the base, white at the tips and bear black spots in the center. The under wings are whitish, folded membranes. The insect is about a fifth of an inch in length. The adult may easily be distinguished from the nymph by its larger size, presence of wings, and absence of reddish coloration.

The eggs are laid in the soil near the roots of the grass. They are about .33 of an inch long and are shaped somewhat like a bean, and are of an amber color. A single female has been found to lay from 105 to 250 eggs.

The young undergo six stages in their development. It is during these stages that the insect is found implanting itself under the leaf sheaf of the grass as previously mentioned. The young, or nymphs, are without wings and have reddish coloration, but otherwise they resemble the adults in appearance. The insects move about freely and may be found on any portion of the plants until the feeding habits are established. The writer has found in his studies that there are at least two generations with an overlapping which may later prove to be a third generation occurring during the summer.

Conditions Favoring Outbreaks

An observation of certain weather conditions is the best indication of an outbreak of chinch bugs in lawns.

Warm and fairly dry weather during the spring and fall are the most favorable periods for the abundant hatching of chinch bug eggs, as they are deposited by the females in the greatest numbers during these seasons. Destructive outbreaks are sometimes prevented by a series of drenching rains, or a prolonged rainy or humid season during the hatching period.

Control Methods

Natural control has been found to be undependable, because the chinch bug can withstand almost any conceivable climatic condition or variation. The range of temperature thru which the chinch bug has been found to subsist is from 15 degrees below zero (Fahrenheit) to 135 degrees (Fahrenheit). Under these extreme temperatures, however, the chinch bugs are found to die in a few minutes.

Fungous Diseases

Fungous diseases known to attack the chinch bug, among which is *Beauveria globulifera*, are entirely dependent on the frequency of cloudy or wet weather during the hatching period of the young bugs. This dependency upon certain kinds of weather prevents these diseases from destroying the bugs in large numbers. This disease attacks many other insects and is present every year throughout chinch bug territory. Therefore it becomes abundant under favorable weather conditions without artificial introduction. Another disease which has been found of value in chinch bug control during humid seasons, and which also attacks the cutworm and other insects, is *Sorospella uvella*.

Because of the fact that these fungous diseases are dependent on weather conditions, it is readily seen that their introduction in the control of chinch bugs is of little economic value.

Predators and Parasitic Enemies

Among these the most important enemies of chinch bugs are lady beetles, trash bugs, and the larvae of lace wing flies. Ants have also frequently been found to destroy chinch bugs. No true parasites have as yet been recorded by the writer as assailing the chinch bug.

Artificial Control Measures

Since the natural enemies of the
Continued on page 16

Relative Susceptibility of Citrus Varieties to Attack by *Gloeosporium Limeticolum* (Clausen)

By Harry R. Fulton, Pathologist, Office of Fruit Disease Investigations, Bureau of Plant Industry, United States Department of Agriculture

Introduction

The lime wither-tip disease is caused by an actively parasitic fungus (*Gloeosporium limeticolum* Clausen) which attacks in their young or tender stages the leaves, stems, flowers, and fruits of the variety of lime known variously as West Indian Mexican, Common Florida, or Key lime. This disease and the fungus causing it must be definitely distinguished from the longer known "citrus wither tip" and the fungus to which it has been generally attributed, *Colletotrichum gloeosporioides* (Uenz.). The latter seems to be in most cases a secondary invader rather than an active pathogen. Clausen has called attention to morphological, cultural, and pathogenic differences in these two fungi. The writer has verified Clausen's main findings in this regard, and concurs in Clausen's view that earlier writers included in somewhat confusing fashion two very different fungi and their effects in their discussions of wither tip of Citrus. This confusion is not altogether surprising in view of the variations which may occur in what is commonly regarded as *Colletotrichum gloeosporioides*, but at the same time the two diseases have many points of difference in their grove manifestation, and the evidence is convincing that the lime wither-tip disease is caused by a distinct species, and not by a strain of *C. gloeosporioides* having unusual pathogenic abilities. Winston, in connection with his studies of citrus tear stain, was unable to find, among numerous strains of *C. gloeosporioides* tested, any indication of active pathogenicity on very young fruits of various citrus species.

Severe losses sustained by growers of limes in southern Florida, especially on the Keys, led to an investigation of the lime wither-tip disease and means of control. Spraying with copper-containing materials, such as Bordeaux mixture or Burgundy mixture has not proved to be entirely successful, due mainly to the fact that infection spreads very rapidly during rainy weather, especially on very tender new shoots that are just expanding or on the blossom parts or on the fruit when quite small (less than $\frac{1}{2}$ inch in transverse diameter),

thus making it difficult or impossible to apply with safety a protective spray-coating at the time when most needed. Secondary drawbacks to spraying may arise from the close and irregular spacing of the lime trees, from the rough topography of much of the land, from the relatively low value of the crop per tree, and from the necessity for special control of scale insects after using copper-containing sprays. Bordeaux mixture plus $\frac{1}{2}$ to 1 per cent oil in the form of emulsion has given more satisfactory results in lime wither-tip control than straight Bordeaux mixture.

It would be very desirable to find some variety of Citrus immune to attack by *Gloeosporium limeticolum* that might be grown as a substitute crop for the West Indian lime, with due consideration of the requirements for citric acid and essential oil production and for beverage use. Accordingly, a rather comprehensive investigation was undertaken along this line, with the hope that it might serve as a basis for further work by horticulturists, plant breeders, or plant pathologists looking towards the final solution of the lime wither-tip problem through the finding of a satisfactory substitute citrus variety, to be propagated by budding, by cuttings, or from seed as might prove most desirable.

The ideal would be to find a naturally immune or very highly resistant individual or race in present plantings of the West Indian lime, which is practically always propagated from seed, and so might offer possibilities along this line. The writer has observed certain differences in incidence of the disease that might indicate individual difference in susceptibility, but he has not yet observed a tree that seemed satisfactorily resistant under very severe infection conditions. Such may possibly exist somewhere, and its discovery would mean the quick reestablishment of the lime industry on a better basis in territory invaded by the lime wither-tip disease, where general economic conditions are favorable.

Natural Infection in Groves

That the disease is very closely confined to the West Indian variety of lime is shown by general field observation during many seasons in va-

rious parts of Florida where the West Indian lime seems to be universally affected but where varieties of orange, grapefruit, lemons, tangerine, mandarin, citron, and even such lime varieties as Kusaie, Woglum's Seedless, Buena Vista, Tahiti, and Persian are not affected when growing in close proximity to diseased West Indian limes. The only other variety observed to be affected under natural conditions has been the Dominican Thornless (or Spineless) lime, which supposedly originated as a sport from the West India lime.

Field Tests

During three seasons, 1919, 1920, and 1922, field tests were made on the March growth of various citrus varieties, species, and related genera to determine possible susceptibility to the lime wither-tip disease. These tests were made on property where the disease existed naturally on West Indian and Thornless limes. All of the tested trees were within 200 feet of such naturally infested lime trees, and yet no natural infection has been observed on them during the tests or during two subsequent seasons. The inoculum was a spore suspension, usually from freshly sporulating lesions on lime shoots, but sometimes from artificial cultures. Inoculations were made by wrapping cotton swabs lightly around the very tender shoots (usually 1 to 4 inches long, with many leaves in very susceptible stages), and covering for two days with paraffin paper. Control inoculations were made for every series on susceptible limes to determine the potency of the inoculum, and favorableness of condition, and water-blank controls were also made on the limes to determine what part of the observed infection might have resulted from spores naturally present on the plant surfaces. The indications were that these last played a minor part during ordinary dry weather, as might be expected, since the shoots chosen had very recently begun to develop, and since the *Gloeosporium* spores depend on dew drip or rain for their distribution.

The only evidence of any susceptibility is shown by the West Indian lime and by Dominican Thornless lime, which is a derivative of it. The

Continued on page 17

Gloeosporium limeticolum

Vegetable Diet Is Summer Boon

By Martha King

Change of temperature enforces an immediate change of wearing apparel upon the average individual, but a great many people fail to take the next logical step and alter their diet. What is good for the human system during cold weather is not the best summer food. Habit has made meat the basis of the American meal, winter and summer, yet from the standpoint of health and comfort, leaving economy out of the question, we are better off if we confine ourselves to lighter foods during the hot summer months.

Milk and eggs, of course, are the best of foods at all times. While supplying maximum nourishment they do not heat the blood. Vegetables, and particularly greens, are likewise good at all times, but nature has especially ordained them for summer eating. Now that we have devised many new ways of preparing them, they are taking their logical place as the staple summer dinner food on the average American table. In the restaurants there is a special vegetable platter on every menu.

It is in the rural home, however, that the vegetable dinner should be most popular, and for several reasons besides the chief one that it is the correct summer food. Primarily, the vegetables can be picked fresh from the garden, than which there is no more economical source of food supply. Again they are easy to cook, and the fire in the range can be dampened off quickly, which is an important consideration in those less fortunate rural houses where a carbide gas plant has not yet been installed, and there is no hot plate to take the place of the range during the summer months. Where a gas hot plate is available, the summer cooking problem is as simple in the country as in the city.

An ideal vegetable dinner may consist of the following. Creamed potatoes, green peas, asparagus, young carrots, spinach, and a poached egg. It may be preceded by cantaloupe, or berries and cream, and followed by a light tomato and lettuce salad. A bit of cream cheese completes a very tasty and nutritious meal, with either iced or hot tea to follow, and of the two the hot tea is really more cooling.

This is a simple healthful dinner, the chief ingredients of which are

vegetables, but much depends upon the way in which it is served and the skill with which it is prepared. Vegetables often lose much of their value as well as their savour by improper preparation and cooking.

Green vegetables, for instance, should not be boiled for long periods. They should be immersed in rapidly boiling water, whose boiling point has been raised by the addition of salt, a tablespoonful to the quart, and cooked only until tender and edible. If boiled slowly and too long, they will lose color and flavor, as well as valuable vitamins. Some vegetables, spinach, cabbage and brussels sprouts for instance, are improved if soaked in cold water before cooking. Others like peas, beans of all kinds, and corn, eggplant and cucumber, are harmed by this process.

In preparing the vegetable dinner suggested, the potatoes from a former meal may be used. They should be cut in cubes, covered with milk, seasoned well and cooked for a half hour over a slow fire. The peas, or beans if preferred, should be cooked in water adequate to cover them, and to which salt has been added, for ten minutes, then drained, and drenched with butter, pepper, salt and paprika. The butter and seasoning make or mar peas or beans, and of course they should not be overcooked.

After being rinsed thoroughly and the tough stems removed, spinach should be soaked in cold water, and then cooked in as little water as possible for ten minutes. Drain the water thoroughly, then chop fine, and add butter, pepper salt, and a little vinegar. The dish may be further improved if sprinkled with the yolk of a hard-boiled egg. Scrap the carrots and slice them lengthwise and across, then place them over the fire with just enough water to prevent burning. After ten minutes the water will have been absorbed, then add butter generously, and season well, especially with paprika.

Asparagus should be cooked quickly in a small quantity of water, then dressed with butter, pepper and salt, and a little lemon juice. Only about three inches of the stalk should be used, and the balance reserved for asparagus cream soup, which is one of the most delicious among all liquid foods.

When the vegetables are about

ready, poach enough eggs for the family, and arrange on pieces of thin toast, buttered. Place the eggs in the center of a large platter, and group the vegetables around them, the carrots between the white potatoes and the green peas, and the asparagus between the peas and the spinach. Sprinkle the whole with salt, pepper and paprika, and garnish it with a few radishes or young onions. The result is a colorful dinner, excellent in taste and in food values.

In serving lettuce and tomato salad the average housewife uses a so-called French dressing, which is a colorless compound almost unknown in France. A much more tasty dressing is made of three parts olive oil, two parts vinegar, in which is mixed dry English mustard, pepper and salt, the whole stirred thoroughly and poured over the salad. In France, each person likes to prepare his own salad dressing, mixing the ingredients to suit his own taste in a large tablespoon. The preparation and eating of food is a ceremonial among the French, and it is upon vegetable dishes they lavish their greatest skill. The results achieved are invariably worth the trouble.

AGRONOMY DEPARTMENT OF EXPERIMENT STATION TO STUDY CROPS AND SOILS

The Florida Agricultural Experiment Station plans a considerable expansion of its agronomy and farm crops work in the future. As a start on this expansion program, the department of grass and forage crops investigators has been made the department of agronomy and will take up investigations of farm crop problems, as well as continue the grass and forage studies.

Studies which this department proposes to conduct as soon as arrangements can be completed include soil fertility investigations, plant genetics and breeding, field crop work, varieties of crops best adapted to different section of the state, fertilizer recommendations for different soil types and sections of the state, and soil building programs. Other studies will be added from time to time.

W. E. Stokes is head of this department, and Dr. W. A. Leukel is assistant.

THE GROWERS' OWN PAGE

KILLING THE SLUGS

San Francisco, Cal., July 26th, 1926
The Citrus Industry,
Tampa, Florida.

The writer receives your monthly publication, the "Citrus Industry", and finds it very valuable indeed. The Florida and California Fruit Industries have a great deal in common, and I became very much interested in the article in your July issue, Page 19,

"THIEVES IN THE NIGHT"

You speak of the "snail" and the "slug"—the night thieves in our gardens all over the world.

I notice from your article, that someone in South Africa and someone in Virginia, is going around at night with a flash light to hunt down and collect the entire colony of snails. Truly, as you say, the slugs hide under the side walks and other obscure places. The writer has a much better and surer way, and if you will publish the following in your paper, your readers will be greatly benefited, and you can put this down in your notebook to be a "sure remedy."

The Stauffer Chemical Company of San Francisco, Calif., and the Stauffer Chemical Company of Los Angeles, Calif., are manufacturing a so-called

"SOILIRON"

which is mostly sulphate of iron, with the necessary phosphates added so that it can be handled better, and also to make it more valuable as a soil treatment for Chlorosis on trees, particularly pear trees. This also gives better color to grapes, and there are many more good reasons for applying it to the soil, particularly where the soil is lacking in iron.

They furnish this in granulated form in the shape of half ground salt, and if the growers and gardeners will put this "Soiliron" around the plant beds, keeping it 6 or 8 inches from the plants, it will mean sure death to the slugs. They will die in about five minutes after they climb over the slight embankment of "Soiliron". Besides, as the "Soiliron" dissolves after the garden is sprinkled, or it has rained, it benefits the soil.

Thousands of people know about this so far as slugs are concerned, and a great many growers are buying this material in large quantities to improve their crops, and also for

This department is devoted to the growers, for their use in giving expression to their views and a discussion of growers' problems. Any grower is welcome to make use of this department for the discussion of topics of interest. The only requirements are that the articles must be on some subject of general interest, must be reasonably short and must be free from personalities. The editor assumes no responsibility for views expressed, nor does publication imply endorsement of the conclusions presented.

the control of Chlorosis.

Very truly yours,

P. M. Paulson.

BANANA CULTURE

Palm Harbor, Fla., Aug., 1st, 1926
Editor, The Citrus Industry
Dear Sir:

Some time ago I was much interested in the articles printed in The Citrus Industry which were written by Mr. W. E. Bolles of Oldsmar relative to banana growing in Florida. I am sorry to miss Mr. Bolles articles because I am very much interested in banana culture in Florida. I have lived near Dunedin and Clearwater all my life and have had over fifty years experience in citrus groves, farms, gardens, poultry raising and banana culture.

Yes, I have been in a small way growing bananas for over fifty years right in this neighborhood, though most of my work has been in the citrus groves and still is. My experience in banana culture was always limited to a few for home consumption and about one old time variety, namely the horse banana or more properly Orinoco, which variety is a very tall and heavy grower and as hardy as any, bearing large heavy heads and heavy fingers on good soil with proper care. It is fine for cooking when on the half ripe order and also excellent for fresh eating when fully ripened on the plant. Many people do not like this variety but if they would only let them get fully ripe on the stalk before cutting, they would find it a good flavored mellow fruit. I have them growing now twenty feet high and sold many bunches last fall and also some this summer to my groceryman.

I also have a few plants of Hart's Choice. The stalks of this variety are very much like the Orinoco but the heads are more compact and the bunches contain more fingers. The fruit is smaller than the Orinoco, very tender and has a mild flavor. This variety comes nearer being

frost proof than any other, though all are tropical and will be killed back by freezes, but they are like water lilies and come up again next spring so fast that we have bananas all the time.

Then I have a few of the Improved Chinese Cavendish. So far as I have experience and knowledge this is the finest of all Florida varieties. The Cavendish is very low and strong in growth and puts out a very compact and heavy head of large, long, delicious fingers. All growers appear to like the Cavendish the best. They are very tender, mellow and highly flavored when ripened on the stalk.

I have all three varieties and I am increasing, now that I have a real plantation on the finest kind of black soil and real muck land. I believe that my banana plantation will equal any of its size in Florida. I had heads of Cavendish last year with 120 fingers to the head and soon I will have them with twice that many fingers.

I would be glad if every reader of The Citrus Industry could visit my banana plantation and see what can be grown in this part of Florida and it can be done on any good black soil or muck land. I have over an acre in Cavendish now and have thousands of plants of all varieties and all are doing fine. There is nothing more tropical or pleasing to the eye than such a banana plantation. All muck land is good for something and I believe should be in banana plantations properly handled.

Very truly yours.

D. A. Nipels.

SAYS COLLEGE TRAINED FARM BOYS AND GIRLS NEED OF AGRICULTURE

Continued from page 11

influence of well trained rural youth. If a country boy doesn't want to study agriculture, there are plenty of other things for him to study.

"I realize the financial difficulty encountered in the last few years by farmers. I know that thousands of farm families can not afford to send their children to college. But when a family can afford it or where a boy has a chance to earn his way, there is no better investment for the future of American farming and American culture generally."

Cheerful looks make every dish a feast.—Messinger.

NOTES OF THE TRADE

BLUE GOOSE TRADE-MARK REGISTERED IN ENGLAND AFTER OPPOSITION

"Owners of trade-marks seeking registration of their marks in Great Britain will be interested in a decision recently made by the British Registrar of Trade-marks in which application to register the "Blue Goose" trade-mark of the American Fruit Growers Incorporated, Pittsburgh, has just been passed upon favorably. The application to register, however, was opposed by an English firm of brokers, Gerald da Costa, of London, England, on the peculiar ground that this firm introduced Blue Goose grapefruit on the English market in December, 1920, and that up to one year ago the name of this firm has been exclusively associated with the distribution of fruit under the Blue Goose brand," says a recent issue of Printers' Ink.

"Frank Kirkpatrick, advertising manager of American Fruit Growers Inc., has forwarded a copy of the decision to Printers' Ink: It shows that the "Blue Goose" trade-mark was first registered in the United States on January 13, 1920, by Thomas Pepper and that the American Fruit Growers Inc., are the successors in business of Thomas Pepper. On December 1, 1920, the American Fruit Growers made its first shipment, consisting of ten boxes of Blue Goose grapefruit, direct to England, which shipment was purchased by Harry A. Smith on behalf of the Fruit and Produce Exchange of Great Britain, Limited, which organization was formed in 1919 by a merger of sixteen large firms which pooled their resources. The firm of Gerald da Costa was one of these firms. The Fruit and Produce Exchange of Great Britain, Limited, is no longer in existence and the firm of Gerald da Costa is not its business successor.

"Another point brought out in the decision is that while the firm of Gerald da Costa has been selling the Blue Goose fruit of the American Fruit Growers Inc., in England during the last five years, other firms also have been doing so, and that none of these firms has any right to the Blue Goose trade-mark simply because it has bought goods bearing this trade-mark and has distributed them.

Counsel for Gerald da Costa submitted that if the American Fruit Growers were allowed to register the trade-mark, the da Costa firm would be prevented in the future from selling Blue Goose fruit. This argument, says the decision, "is quite irrelevant to the question whether or not the applicants (American Fruit Growers) should be allowed to register a mark which is shown to belong to them."

Another interesting point mentioned in the decision is the following: "The shipment mentioned above (December 1, 1920) was subsequently distributed gratuitously to certain prominent people in Great Britain, and whether or not the opponent firm (Gerald da Costa) took charge of the distribution, it is clear that such distribution was made on behalf of the Fruit and Produce Exchange of Great Britain, Limited. Furthermore, Mr. da Costa frankly admitted at the hearing that the labels in which the fruit distributed was packed all bore the trade-mark 'Blue Goose' with the device of a goose and the name American Fruit Growers Inc. It is clear, therefore, that this distribution of the applicant's fruit, upon which the opponents largely rely for their case, in effect assists the applicant's case, as it clearly identified the goods under the "Blue Goose" mark as being the applicant's goods. From replies received from some of the fortunate recipients of the fruit, as shown in Exhibit 5 to the declaration of William H. Baggs, it is clear that the recipients did not associate the fruit under the mark with the opponent firm."

CHINCH BUG CONTROL ON ST. AUGUSTINE GRASS

Continued from page 12
chinch bug cannot be depended upon to hold it in check, it is obvious that those who wish to keep their lawns in flourishing condition must use artificial control measures to prevent injury by this pest.

The writer's introductory experiments in chinch bug control were conducted with the use of nicotine sulphate or tobacco dust, and also the introduction of tobacco stems to the lawn. Nicotine sulphate spray was applied at the rate of one part to 800 parts of water. In most cases these experiments were not found very effective because of the peculiar

BIG FERTILIZER ORDER

The Hastings Potato Growers Association, it is learned, has recently awarded the 1926 fertilizer contract to the Atlantic & Gulf Fertilizer Co., of Jacksonville. From information received the requirements of the Association call for 6500 tons of mixed fertilizer, consisting of several formulas, suitable to the soils in and around the Hastings section. The success of this Association since its organization is significant of the possibilities for co-operative effort in land cultivation and marketing throughout all Florida.

nature of the insect's feeding habits upon the grass attacked, as mentioned elsewhere in this paper.

The most effective results in control were obtained by the use of calcium cyanide, a newly produced chemical, which as shown from the writer's experiments, is about half as strong as sodium cyanide, a material which must be used in enclosures, such as the fumigation of greenhouses, flour mills, or tented fruit trees. The action of this chemical when applied under normal conditions of humidity and temperature, or when applied to moist soil, is the liberation of hydrocyanic acid gas in such quantities as to destroy all insects and rodents, the period required depending on temperature and moisture.

A series of experiments were conducted with calcium cyanide by sowing the dust broadcast over the lawn. Calcium Cyanide is manufactured in three forms: flakes, granules and powdered or dust. All of these forms were used in the experiments, but the most effective results were ob-

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tained by the use of the dust. This was sown broadcast over the lawn. Different applications were made, ranging at the rate of from 60 lbs. to 200 pounds per acre. The dust was applied in the heat of the day when the lawns were perfectly dry. An inspection from 12 to 24 hours after the application of the dust showed that the most effective results were produced by the application of the dust at the rate of 150 pounds per acre. In most cases where more than 150 pounds per acre was applied uniformly over the lawn injury by burning was experienced. The best safeguard found by the writer was the use of a little lighter application and a repetition of the experiment in about five days.

Method of Applying The Dust

The methods used in applying the dust with most satisfactory results were first, by means of the fan or blower duster. The bellows duster was not found to be so satisfactory because of its intermittent flow of dust. Another method which was found quite satisfactory was the use of a large can or bucket with a closely fitting cover which was punctured with a 6 or 8 penny nail to form a sifter top. By this ingenious device the dust can be sifted uniformly over the lawn. Under favorable conditions the most effective killing results were from 80 to 95 per cent. of the chinch bugs.

The dust should be applied when there is as little wind as possible during the heat of the day, and the operator should be careful not to get his head directly over the container, or to breathe in the dust or fumes from the freshly opened cans. Where this precaution is observed there is very little danger. If one stands on the windward side of the container there is no danger in handling the material in the open air.

Calcium Cyanide

Calcium Cyanide is a substance having somewhat the appearance of slate. When exposed to the moisture in the air it gives off hydrocyanic acid gas, and where sufficient quantities are applied it is deadly to all forms of plant and animal life. When Calcium Cyanide is applied to a lawn there is no danger of the fumes of the hydrocyanic acid gas rising in sufficient quantities to be injurious to human life since it has about the same density as air.

Whenever the application of Calcium Cyanide is completed, the duster or sifter used should be thoroughly cleaned, as when Calcium Cyanide unites with the moisture in the air a reaction takes place which corrodes the metal portion of the sifter or duster, and either affects the effi-

THE CITRUS INDUSTRY

ciency of their working or destroys them entirely by eating holes in the metal.

RELATIVE SUSCEPTIBILITY OF CITRUS VARIETIES TO ATTACK BY GLOEOSPORIUM LIMETICOLUM (CLAUSEN)

Continued from page 13

tests included a representative lot of commercial citrus varieties, as well as a considerable range of unusual citrus varieties, species, and a few related genera. Puncturing did not increase materially the percentage of susceptibility for the West Indian and the Thornless limes, indicating that the shoots selected for the tests were young enough to have practically maximum susceptibility without artificial injury.

The field evidence is thus very strong that the lime wither-tip disease is closely restricted to the West Indian types of lime.

Greenhouse Inoculations

Potted plants, three of each variety, were cut back severely so as to induce the sprouting of a considerable number of young shoots. When these were barely starting the plants were placed in an inoculation case where the air was kept practically saturated with moisture. Spore suspensions of *G. limeticolum* were atomized over these plants 10 times during 21 days. Then the young shoots, which had attained several inches in length, but were somewhat etiolated and quite succulent, were punctured, dipped in a strong suspension of lime wither-tip spores, wrapped in wet cotton swabs, and replaced in the inoculation case for four days. Final observations were made eight days after removal from the inoculation case. Included in this test were West Indian lime, Kusaie lime, Sweet lime, Ponderosa lemon, seedling California lemon, Gold Medal grapefruit, Silver Cluster grapefruit, Pineapple orange, seedling orange, Mandarin orange, Dancy tangerine, Sour orange, Cuban tangelo, and Mohawk orangelo.

The West Indian lime plants had all of the young shoots destroyed by wither tip during the first part of the experiment and no new growth was made. None of the other varieties was affected by the wither-tip disease during the progress of this very severe test.

In another somewhat similar test an inoculation chamber was used at an average temperature of 80° F. with the air practically saturated. Three plants of each variety were selected, all having very tender shoots with leaves just beginning to expand.

Continued on page 24

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Cent Special	3	5	6
Citrus Special 4-8-8	4	8	8
Gem Orange Tree	4	6	5
Gem Tangerine	5 1/2	12 1/2	7 1/2
Satsuma Special	4	6	5

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Citrus Groves As An Investment

Hunt Bros., grove caretakers of Lake Wales, Florida, have just issued the following statement as to the investment value of citrus groves and also a record of actual yields and crop values for the past season. This statement will be found of great value not only to prospective grove owners but also to those who are already engaged in citrus culture by giving them a basis for comparison of their own returns with those of other growers. Hunt Bros. statement follows:

Groves As An Investment

Immediately after the war fruit prices went soaring and many groves gave fabulous returns. It was not at all uncommon during that time for a good grove with a good crop of fruit to give a net return of \$2,000.00 per acre. During this period a number of large grove development projects were started and the salesmen often quoted many such remarkable records and by inference at least led those buying from them to believe that their groves would do as well. Nearly every agricultural industry went thru the same period of affluence only to come down to earth in a few years.

During the years 1921-22, 1922-23 and 1923-24, fruit prices slumped badly. One reason for this was the slump in all lines of industry. Another was that the large prices had encouraged growers to increase their yields by heavy fertilization at the expense of the quality of the fruit. During the slump many growers found that they were operating their groves at a loss when they had expected a handsome profit. They became unduly pessimistic and discouraged, failing to realize that their groves were still young. Some grove owners without previous experience with citrus have come to doubt whether a grove ever will pay. This is the opposite extreme from expecting groves to yield fabulous returns.

In order that our readers may know about what they may expect we wish to make some general observations and then give a report on a number of specific instances of grove performance this past season. We have not searched the state over for these records but have taken them all from the Ridge where all the groves are comparatively young and where the soil is on the whole very

much alike.

Groves do not, as a general thing, come into commercial bearing until they are five years old. They will often bear some fruit when two or three but it should be picked off. By and large, the first crop which can be handled commercially is produced when the trees are five years old. This crop is quite a tax on the young tree and as a general thing it produces no crop the sixth year. In fact, considerable dead wood often develops in the grove as the result of the strain of carrying its first crop. The grower may be discouraged, thinking that his grove is going back. If the crop produced the fifth year sells for more than the cost of caring for the grove for a year, the grower may consider himself fortunate. During a year of fancy prices, such a grove may yield a wonderful return. We have known of three year old groves paying handsome returns. These are the exceptions that prove the rule.

During years of ordinary average prices, one should not expect a grove to pay dividends till it is eight or nine years old. From that time on, if it has had proper care and contains good varieties it should pay bigger and bigger dividends as the years go by. We do not know how old a grove must be to be too old to produce profitably. No one in Florida is that old. We do know that the most profitable groves on the Ridge are the oldest ones and that if given good care, the older a grove is the better it should be during the first hundred years. We do not care much about the second hundred.

Actual Yields Last Season

We will now give a record of the actual yields last season for a number of groves. Unfortunately, in many instances, the owners do not want their names given so that we are not giving the names of any of the grove owners, but in each and every case, we vouch for the accuracy of the figures given and will undertake to get permission from the figures privately in case any of our customers care to investigate more carefully into any of the reports.

No. 1

Seven acres of ten year grapefruit, and thirteen acres of seven year old oranges, total 20 acres.
Received for fruit \$3,440.80

Cost of producing fruit * 1,326.50

Profit for year \$2,113.30

* Taxes not included. This grove has more fruit set now than last year.

No. 2

Ten acres of 12 year old trees mostly grapefruit, a few Valencias, Tangerines and Pineapples.

Received for fruit \$5,073.62

Cost of producing fruit * 1,494.10

Profit for year **\$3,579.52

* Taxes not included.

**This grove did as well last year and has a big crop set.

A point of interest on this grove is that the fertilizer cost \$713.22, while the labor and other cost was \$780.88. Almost half of the cost was for fertilizer. The cost of a grove this age depends on condition of trees and amount of fruit or in other words, the quality and amounts of fertilizer required.

No. 3

Ten acre seven year old grove of Pineapples, Valencias and Grapefruit.

Received for fruit \$833.65

Cost of producing fruit * 667.62

Profit for year **\$166.03

* Taxes not included.

**This is not a show grove at all, just a very average grove with a light crop last year. Note that it is only 7 years old. It will grow better.

No. 4

Thirty-eight acre grove, half oranges and half grapefruit, 12 years old.

Received for fruit 20,892.50

Cost of producing fruit about 6,600.00

Profit for year \$14,292.50

No. 5

Ten acre grove of half grapefruit and half Valencias; eleven years old.

Received for fruit \$2,716.26

Cost of producing fruit * 1,421.12

Profit for year \$1,295.14

* Taxes and road maintenance included.

This grove has a heavy crop set for this season.

No. 6

Ten acre grove, half grapefruit and half Valencias, eleven years old.

Received for fruit \$2,594.14

Cost of producing fruit * 1,532.11

Profit for year \$1,062.03

Continued on page 21

August, 1926

NEARLY MILLION CARS OF PRODUCE SHIPPED LAST YEAR

Shipments of 38 fruits and vegetables in the United States last year filled 978,927 cars, an increase of about 10,000 cars over 1924, according to Department of Agriculture figures.

White potatoes alone filled 241,528 cars, apples 118,036 cars, grapes 81,865 cars, oranges 57,035 cars, watermelons 44,184 cars, and peaches 40,829 cars.

The figures do not include shipments by small boat lines, and by wagons and trucks.

Total Shipments of Products Reported During 1925

	Cars
Apples - - - - -	118,036
Asparagus - - - - -	1,906
Cabbage - - - - -	39,168
Cantaloupes - - - - -	30,168
Carrots - - - - -	3,488
Cauliflower - - - - -	5,288
Celery - - - - -	21,108
Cherries - - - - -	2,304
Cranberries - - - - -	2,014
Cucumbers - - - - -	8,492
Dried Apples - - - - -	1,338
Dried Peaches - - - - -	624
Dried Prunes - - - - -	7,927
Dry Beans - - - - -	17,540
Eggplant - - - - -	367
Grapefruit - - - - -	19,933
Grapes - - - - -	81,865
Green Peas - - - - -	2,707
Lemons - - - - -	11,590
Lettuce - - - - -	37,270
Melons, misc. - - - - -	3,645
Mxd. Citrus Frt. - - - - -	4,860
Mxd. Deciduous - - - - -	7,112
Mxd. Vegetables - - - - -	32,211
Onions - - - - -	31,073
Oranges - - - - -	57,035
Peaches - - - - -	40,829
Pears - - - - -	21,015
Peppers - - - - -	2,372
Plums & Prunes - - - - -	5,195
Spinach - - - - -	7,965
Strawberries - - - - -	12,246
String Beans - - - - -	5,224
Sweet Potatoes - - - - -	18,571
Tomatoes - - - - -	28,233
Turnips & Rutabagas - - - - -	1,709
Watermelons - - - - -	44,184
White Potatoes - - - - -	241,528
TOTAL - - - - -	978,927

SPREAD PARASITIC FUNGI IN GROVES TO CONTROL

LARGE BROOD WHITEFLY

The summer brood of whiteflies now on the wing seems to be larger than for several years, according to J. R. Watson, entomologist of the Florida Experimental Station, who has just returned from a trip over the citrus belt. The citrus grower will therefore need to put forth more effort in fighting this pest, says Mr. Watson.

Mr. Watson advises spreading the parasitic fungi during July, when rains are of almost daily occurrence. The red aschersonia, a good parasite of whitefly, can be purchased at \$1 per culture from the Entomological Department of the State Plant Board at Gainesville, who will also furnish directions for applying it. The brown whitefly fungus is also a good one to spread in the groves.

This is not a very favorable time to spray for whitefly, but when the

THE CITRUS INDUSTRY

brood now on the wing has laid eggs and they have hatched, which will probably be the latter part of July. one may spray with oil emulsion. However, spraying in July with its high temperatures and heavy dews and almost daily rains is a somewhat trying experience, and if good growth of the parasitic fungi can be obtained it will probably be safe to postpone the use of oil emulsion until the eggs of the fall brood have hatched in late September or October. If, however, the last part of July should be exceptionally dry and the whiteflies abundant, spraying

Nineteen

with an oil emulsion might be advisable, says Mr. Watson.

Virginia Wagner, an Orange County club girl, is so interested in her club work that she walked five miles to attend the last meeting of her club at Taft.

A glass of water apiece before breakfast for all members of the family will do a lot toward keeping their systems in good working order through the hot weather.

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TAMPA, FLORIDA

Pecan Scab Control

By G. H. Blackman, In Collaboration With Dr. O. F. Berger

Owners of pecan orchards of varieties susceptible to scab are thinking of a program that can be successfully and economically followed and will control this destructive disease.

Teche, Moneymaker, Stuart, Frot-scher, Success, Curtis, Kennedy, Rising, Randall, Moore and Pabst, in the order named, of the varieties grown in Florida, are the most resistant to pecan scab. Delmas, Van Deman and Schley are the most susceptible. Most of the Delmas and Van Deman and some of the Schley have been top-worked to more resistant varieties. However, owing to the fact that Schley is a very valuable nut and commands such a high price on the market, many growers prefer to control scab rather than top-work Schley trees to some of the varieties that sell for a much lower price.

Spraying experiments conducted by the Florida Agricultural Experiment Station during the growing seasons of 1924 and 1925 have given excellent results. The spray material giving the best control was 4-4-50 Bordeaux mixture to which had been added one-half pound calcium caseinate as a spreader and sticker. (Circular on the making of Bordeaux mixture will be furnished upon request.)

The number of applications of Bordeaux will depend to some extent on the rainfall and the infection in the orchard. However, in most cases four applications will effect control to such an extent that a satisfactory production of nuts will be had. During a very dry growing season the grower may successfully control the disease by the use of three applications of spray material.

It is very important that the applications of Bordeaux be made at the proper time, for Bordeaux prevents the development of pecan scab and does not cure it after the disease has made its appearance. The first application should be made immediately after the nuts have set. This can easily be determined by examining the end of the nut which will have a dry brownish appearance instead of being green and sticky. Then is the time to make the first application. The second should be made about four weeks after the first; the third three to four weeks after the second; and the fourth three to four weeks after the third. During a dry growing season all sprays except the first may be de-

layed somewhat until three applications will hold the disease in check. This is possible because pecan scab spreads and develops much more rapidly during wet years than during dry ones.

It is very important that all applications of Bordeaux be made thoroughly and all parts of the tree and nuts should be covered with the spray material. If the spraying has been done properly the entire tree will present a uniform bluish cast, but one sprayed improperly will show splotches and streaks of the Bordeaux about over the tree. Probably the easiest way to spray thoroughly is to begin in the center of the tree and spray all branches and underside of the foliage first; then spray the outside. In this way the operator will not have to work in the spray that drips from the trees. No grower can hope to control pecan scab or any other disease unless the work is thorough. It would be better not to spray at all than to do a half-way job and then condemn the practice because it did not do the work. It is, therefore, absolutely necessary that the spraying be done properly. Should there be a rain before the Bordeaux dries the application must be repeated to get effective results.

Equipment

High pressure should be maintained at all times at the guns, otherwise all parts of the tree and nuts cannot be reached. For trees eight years old and younger, 200 to 250 pounds will serve, but for older trees, 300 to 400 pounds pressure will be required. With this in mind the grower should be very careful when purchasing a spraying outfit and get one that is sufficiently large and built to handle such a load. A machine that is not built to develop and maintain these high pressures is sure to prove expensive and a disappointment.

The spray gun is the type nozzle giving best results in spraying pecan trees. All power spray machines should be of sufficient size to maintain the desired pressure with two discharge hose operating two guns. The smaller size trees indicated can be sprayed very nicely with an outfit equipped with sufficient pump capacity and a three or four horse power engine. In handling the larger trees it will be necessary to have a larger pump and an engine of six or more horse power. In spraying

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trees over 25 feet tall, the outfit should be equipped with a third lead of hose, with a cutoff, to which is attached a straight nozzle for throwing the material to parts of the tree that cannot be reached with the spray guns.

Each lead of hose should be at least 50 feet in length. This will give the man at the gun sufficient play to work around the tree in such a way as to do a good job.

An adequate water supply is very important to insure proper spraying, for without water convenient it will be impossible to do the work economically and at times when the application of Bordeaux is most important. If not possible to have the water supply within or adjacent to the orchard there should be a supply tank mounted on trucks in which to haul water to the sprayer. Such an arrangement makes it possible to keep the machine running with a minimum of delay.

When Bordeaux is correctly made and the spraying done thoroughly the investment will pay, otherwise, the work will prove expensive and failure to control the disease will result.

CITRUS GROVES AS

AN INVESTMENT

Continued from page 18

* Taxes and road maintenance included.

This grove had an excellent crop of Valencias but the grapefruit crop was short. It has an excellent crop of both grapefruit and Valencias set for this season.

Note: The figures and records given on the above 6 groves are not of unusual groves, but were taken indiscriminately and are certainly not above the average of Hunt Bros. groves.

No. 7

Ten acre grove of five year old grapefruit.

Received for fruit \$708.02
Cost of producing fruit unknown

The cost producing this crop was probably about \$650.00. That leaves but little profit, but see the age of the grove. We have just received a letter from the owner showing marked dissatisfaction with the returns whereas we consider them very good under the circumstances. Six years hence this grove should be doing as well as No. 2. The returns on this five year old grove are above the average.

No. 8

Ten acre 13 year old grove, half oranges and half grapefruit.

Received for fruit \$6,808.09
Cost of producing 1,111.03

Profit for year \$5,697.06

THE CULTIVATION OF CITRUS FRUITS

By H. HAROLD HUME

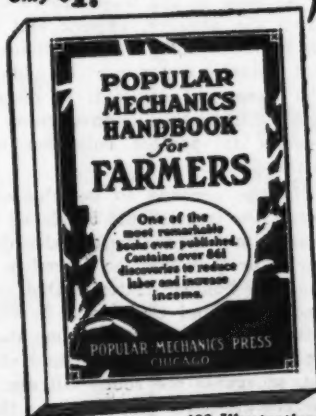
Illustrated

The author of this manual is recognized throughout Florida and the Gulf Coast as an authority on citrus fruits, but his book is not confined to this region. Mr. Hume has been a teacher and investigator in the University of Florida, and is now a citrus-grower and nurseryman of large experience. This new book is founded on the author's "Citrus Fruits and Their Culture," long a standard treatment in its many editions. The present work, which is abundantly illustrated, considers the whole subject of the culture of oranges, kumquats, grapefruit, lemons and others, as varieties; land and location, propagating, planting, tilling, fertilizing, pruning, spraying, harvesting, shipping, and marketing. The author also discusses the botany of the group, history, breeding, insects, diseases, and related questions. This book promises to become the standard treatise for its field. Price \$5.00.

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Transplanting Pecan Trees

By G. H. Blackman

The pecan is growing in popularity and importance in Florida. Its culture promises to become a major industry in the northern half of the state. In order to meet the requests of persons desiring to start plantings (large or small) of this tree, the following general instructions have been compiled:

Preparing the Soil

It is very important that the land to be planted to pecans be put in the best condition by thoroly breaking and disking. The planter should bear in mind that everything that can be done to help the tree to become established in its new location will add to the success of the orchard. Therefore, in preparing the soil it should be remembered that in reality the cultivation of the orchard has been started. It should be remembered also that if the soil is put in first-class shape, it will be ready to receive the roots of the trees and start them off growing under the best possible circumstances.

Staking and Digging the Holes

After the soil has been put in condition, the holes should be staked off the proper distance, not less than 50 feet each way. On the more fertile soils of Florida trees should stand from 60 to 80 feet apart each way. Some planters are recommending the planting of pecans 35 feet apart in 70-foot rows, cutting out every other tree when the branches begin touching, thus leaving the trees 70 by 70 feet. If the planter will actually do this thinning when the time comes, such a method is a good one. Otherwise, the proper permanent distance should be established at planting time.

The orchard may be laid out by either the square or hexagonal method. The former is the one more generally used and is also the easier to lay out. The latter is preferred by some planters and growers, the main advantages being that it is possible to plant a larger number of trees to the acre than with the square. Planters interested in setting an orchard by this method will be furnished instructions upon application to the Florida Agricultural Experiment Station.

No. trees required to plant one acre Square Method:

- 25 x 50—34 trees plus
- 30 x 60—24 trees plus
- 35 x 70—18 trees plus
- 50 x 50—17 trees plus
- 50 x 60—14 trees plus

- 50 x 70—12 trees plus
 - 50 x 80—10 trees plus
 - 60 x 60—12 trees plus
 - 60 x 70—10 trees plus
 - 60 x 80—9 trees plus
 - 70 x 70—8 trees plus
 - 70 x 80—7 trees plus
 - 80 x 80—6 trees plus
- Hexagonal Method
- 50 x 50—20 trees plus
 - 60 x 60—13 trees plus
 - 70 x 70—9 trees plus
 - 80 x 80—7 trees plus

The holes may be marked off by plowing a furrow each way the proper distance apart, or by sighting with stakes and driving a stake where each tree is to set. Dig the holes at least 30 inches in diameter and three feet deep, keeping the top soil separated from the subsoil; only the former should be filled in around the roots. If possible, have the holes ready by the time the trees are received from the nursery.

Planting

Pecans are planted during the dormant season, the earlier the better. Possibly the best time under Florida conditions is between December 1 and 15.

As soon as the trees are received from the nursery, unpack and heel in in moist soil; if the moisture is not dequate, water must be added or the roots will dry out. If properly cared for in this manner, trees will remain in perfect condition until planted.

If the acreage to be planted is large, the trees should be placed in a wagon and kept covered with damp sacks, or they may be placed in the moisture-holding material that came packed around the roots. In either case, only one tree at a time should be taken from the wagon and planted, otherwise the roots will dry out before the soil is placed around them.

When the tree is in line and at the proper depth, place the top soil around the roots and make it firm with the feet, being careful that the lateral roots are in their natural position. When the hole is three-fourths filled, add several gallons of water. After the water has been absorbed, fill the hole completely with soil.

Pruning

All the pruning necessary at planting time is just enough to balance the top and the root, favoring the latter to some extent. Thus the top should be cut back from a third to a half, while the roots need to have only all broken or bruised parts cut

off, making smooth cuts with the knife in order that the parts will heal over readily.

FOUNDATION ESTABLISHED AT ATLANTA

For the purpose of rendering a helpful and constructive service to growers and their families in the southeast, a branch of the Sears-Roebuck Agricultural Foundation has been established at Atlanta, according to announcement made by Samuel R. Guard, director of the main office of the foundation at Chicago, George C. Miggar, formerly in charge of the farm and market programs from Radio Station WLS, Chicago, and recently director of farm programs for the foundation from Station WFAA, Dallas, Texas, will be in charge of the foundation office at Atlanta.

"The rapidly-advancing farming industry of the southeast requires that the foundation provide a distinct type of service for this section, stated Mr. Guard. "By every means possible we plan to make economic information available to farm people that will help them to solve their everyday problems.

The radio will be utilized extensively in the program of the foundation. Through an arrangement with the Atlanta Journal Station WSB, four programs each week will be broadcast. Each Monday, Wednesday and Friday noon, an R. F. D. program will be on the air, carrying a complete farm market service into thousands of farm homes. Quotations on cotton, livestock, dairy and poultry products, and fruits and vegetables will enable every radioized farm home to keep in touch with market trends.

Entertainment that farm folks like will also be provided on the noonday programs, and an hour of music will be featured on WSB each Monday night from 8 to 9.

In addition to its farm radio service, the foundation is offering a question and answer service to farm folks. A corps of southeast farm authorities will be retained as foundation advisors to handle farmers' problems. Farm economic surveys will be made from time to time and the results made public.

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this past season have had an INCOMPARABLE record where they have been put under POTATOES, TOMATOES, PEPPERS, CABBAGES, CUCUMBERS, BEANS and other TRUCK CROPS. Others may offer cheaper fertilizers but there are

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RELATIVE SUSCEPTIBILITY OF CITRUS VARIETIES TO ATTACK BY CLOEOSPORIUM LIMETTICOLUM (CLAUSEN)

Continued from page 17

These were punctured, and the inoculum, a heavy suspension of spores from lime lesions, was applied with cotton swabs. Further applications of spore suspensions were made with an atomizer on the second and the fifth day. On the sixth day the plants were removed from the inoculation chamber.

The West Indian lime plants developed 100 per cent infection. No infection developed on other varieties in the test, namely, Sweet lime, Rangpur lime, Kenedy lemon, Ponderosa lemon, seedling California lemon, Dancy tangerine, Mandarin orange, Pineapple orange, seedling Florida orange, Sour orange, Silver Cluster grapefruit, Gold Medal grapefruit.

Tests were undertaken to determine the susceptibility of a large number of plants grown under greenhouse conditions. Most of these were 1 to 3 years old, well branched, and furnishing flushes of growth that seemed normal. The inoculum was usually a freshly made spore suspension from an actively sporulating wither-tip lesion on the West Indian lime, but in some cases the spores were from pure cultures of *G. limetticolum*. Very young shoots were selected that had leaves young enough to develop infection if the plant was susceptible. In some tests the leaves were punctured some 50 times each. The spore suspensions was applied on wet cotton, the shoot wrapped in paraffin paper, and the plant placed in a large glass-enclosed inoculation chamber over wet sand. Observations were made after 7 to 10 days. Control tests were carried on with each series to show the pathogenicity of the inoculum on West Indian lime.

The cases recorded above as doubtful showed decided death of tissue, but did not develop typical *Gloeosporium limetticolum* sporulation. It is very likely that such lesions were produced by saprophytic organisms that were able to invade and break down tissues under the rather extreme conditions of inoculation. In the writer's opinion these doubtful cases are in all probability negative.

In the case of citrons, 10 strains or varieties were furnished by the Office of Crop Physiology and Breeding Investigations. Six of these lots did not show any positive evidence of infection by *G. limetticolum*, and they are averaged together in the tabulation. Four other lots did show low percentages of what seemed to be positive, although not perfectly typi-

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cal infection. This was verified by culturing *G. limetticolum* from the lesions in punctured shoots, and by securing typical infection on limes from such cultures; and on this basis a positive record was made in such cases. However, the absence of any such cases on the unpunctured shoots, and the occurrence on citrus of a large proportion of doubtful lesions in which the presence of *G. limetticolum* could not be demonstrated, would lend support to the view that tender shoots of these citrons are rather subject under the conditions of the puncture experiments, to invasion by saprophytic fungi among which *G. limetticolum* may sometimes be found. Certainly these citrons, classed as susceptible varieties of limes, and the lesions recorded as positive did not have all the typical features of lime wither tip.

Besides these somewhat questionable results from certain citrons, there is no positive susceptibility except in the group of limes, and among the varieties tested in this group the susceptibility is sharply confined to the West Indian lime and to Dominican Thornless lime.

General Discussion

Clausen, in his description of *G. limetticolum*, gives three host plants, *Citrus medica* var. *acida* Hook. (*C. aurantifolia* Sw., and includes the West Indian lime which is referred to by Clausen as sour lime), *C. limetta* Risso, and *C. limonis* L. Clausen explains that the last two were artificially infected in greenhouses and that "the report of pathogenic properties on the sweet lime, *C. media* var. *limetta*, is according to C. O. Smith who is working at Whittier, Calif., with a strain of fungus supplied by the writer." The strain of Sweet lime used in the present investigation did not give positive results in 7 tests including 45 shoots, punctured and unpunctured as well as in 2 special tests of 3 plants each. Clausen reports only 2 tests of lemons (*C. limonis* L.—*C. limonia* Osb.) with *G. limetticolum*. Two trees were used in each; 1 test was negative for both trees, in the other test one tree developed "an infection of three young leaves, the other lemon, as well as the control, was not affected in any way." He further states, "the extent of parasitism on the lemon was not fully demonstrated in the experiments, but the parasitism in the one positive case was unmistakable." Clausen's inoculation tests included: 19 on sour (West Indian) lime of which 13 were positive, 4 on lemon of which 3 were negative, 8 negative on sweet orange, 7 negative on grapefruit, and 4 negative on tangerine

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orange. Adopting the view that the sour lime, the sweet lime, and the lemon are all varieties of *C. medica* L., he states in his summary that the wither-tip fungus in his artificial infection attacked only forms and varieties of this one species.

The present investigation gives much more extensive evidence that most citrus types are immune to attack by *G. limetticolum*. It casts doubt on the reported susceptibility of sweet lime and lemon, and raises the question of whether or not certain citrons may have slight susceptibility when wounded.

It is interesting to note that commercial plantings of the West Indian lime are commonly made from seedlings. These have remarkable similarity in their general characteristics, and all seem to be highly susceptible to the wither-tip disease. A constant lookout has been kept in affected groves, and special tests of seedlings have been made for individuals immune to the disease. As yet no such individual has been found. It is possible that such individuals do exist, and the prompt discovery of one plant with high resistance or complete immunity would mean a quicker and more satisfactory solution of the wither-tip-control problem than the substitution of some other citrus variety that is immune, or the development of some new type by hybridizing.

The Dominican Thornless lime seems almost as susceptible as the ordinary West Indian lime. The percentages of experimental infection were very much the same for these two varieties; the experimental lesions on the former usually developed more rapidly and extensively than on the latter; but the natural grove infection seemed somewhat less severe. This thornless type, commonly supposed to be a sport from the West Indian lime, is quite distinct from it in fruit, and stem characteristics. Seedlings from it seem to be more variable than those from the West Indian lime. Keys has reported a peculiar dying and shedding of the flowers and very young pistils, due to an aborted condition of the stigmas, which might be confused with wither-tip attack.

Is susceptibility to attack by *G. limetticolum* a dominant character in inheritance? The practically universal susceptibility of West Indian lime seedlings would support a positive answer if the embryos result from true fertilization. On the other hand, the two hybrids tested that have West Indian lime seedlings would support a positive answer if the embryos result from true fertilization.

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On the other hand, the two hybrids tested that have West Indian lime parentage are nonsusceptible. Certainly the Dominican Thornless lime is very susceptible, and is the only citrus variety besides the West Indian lime out of several scores in the present tests for which there is unquestioned evidence of high susceptibility. It will be interesting and important from the standpoint of genetics to test the susceptibility of a considerable number of seedlings of the Dominican Thornless lime, as well as more hybrids of the West Indian lime.

Summary And Conclusions

The evidence here presented includes field observations on a large number of citrus varieties, species, and related genera growing near lime trees that were always severely infected with lime wither tip, as well as the results of artificial inoculations made during three seasons on wounded and on unwounded tender shoots both in groves in Florida and in a greenhouse near Washington, D. C. The West Indian lime and the Dominican Thornless lime have constantly shown a high degree of susceptibility to infection by *Gloeosporium limetticolum* of very young leaf, stem, and fruit tissue. These two va-

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rieties are probably closely related to each other. None of the other varieties of lime tested has given undoubted indication of susceptibility. Certain strains of citron (*Citrus medica* L.) have shown a typical invasion of wounded tissue by *G. limetticolum* in a comparatively small percentage of cases under greenhouse inoculation. Other varieties of limes (*C. aurantifolia* Sw.) as well as the majority of varieties of *C. medica*, have been absolutely immune to infections of the tests. This also holds true for certain first-generation hybrids having West Indian lime parentage that were subjected to test, and for representative varieties of round orange (*C. sinensis* Osb.), for grapefruit (*C. grandis* Osb.), for lemon (*C. limonia* Osb.), for kid-glove oranges (*C. nobilis* var.), and for a considerable number of miscellaneous species of *Citrus* and genera related to *Citrus*.

The close restriction of susceptibility in so far as is known practically to two very closely related seedling horticultural varieties of lime gives promise for successful substitution of other types of lime for the susceptible ones as a means of ultimately escaping losses from the disease, and points to the availability of a wide range

Twenty-five

of immune breeding stock as a basis for hybridization. Susceptibility seems not to be a dominant character in first-generation hybrids with other citrus species, but the natural seedlings of the West Indian lime, practically without exception, are highly susceptible. However, there is the possibility that a natural seedling may be found possessing immunity and having the desired characters of the West Indian lime. Such a find would possibly result in most effective and satisfactory control of the very destructive lime wither-tip disease.

NO WONDER

"O see that pig," said Sam's best girl, "Why has his tail a corkscrew curl?" "His tail," said Sam, "is curled with joy For he belongs to a pig club boy." —Agrigraphs.

Where there is a surplus of eggs this summer, some may be put down in water glass for home use next winter, when eggs produced then can be sold for a better price.

Which is better, three gallons of milk a day from one cow or from three cows?



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"QUALITY FERTILIZER for QUALITY FRUIT"

THE RELATIONSHIP BETWEEN PRODUCERS & CONSUMERS OF CITRUS FRUITS

Continued from page 6

before the consumer. Gluts should of course be avoided, but violent fluctuations in supplies due to arbitrary action are thoroughly demoralizing, and consumers cannot keep up with such conditions.

It should be the aim of every producer of citrus fruits in every phase of his operation, to produce the highest possible average in both inherent quality and appearance. Supplementing this with proper care in harvesting and standardizing in packing and with efficient marketing under a well recognized and favorably known tradename with means of easy and accurate identification on the part of the consumer, the producer has every reason to anticipate consistently satisfactory results.

The extent to which a grower is willing to recognize these truths and be guided by them often determines the measure of his success. It is absolutely essential that we eliminate any idea of putting anything over on the consuming public. We must not permit ourselves to be governed solely by selfish interests and must recognize the truth that in the long run "He profits most who serves best."

FLORIDA COMES SECOND IN 1925 NATIONAL CLUB ENROLLMENT CONTEST

Florida finished second in the 1925 national boys' and girls' club membership contest, according to an announcement just issued by the National Committee on Boys' and Girls' work, in charge of the contest. Florida's club enrollment for 1925 was 202.9 percent of the 1924 enrollment in the state. Arizona took first place with a 1925 enrollment of 218 percent.

Florida boys and girls to the number of 11,837 completed the work in 1925, in comparison with 5,834 for 1924. This is an increase of 102.9 percent. A statewide club enrollment week was held during October, 1925, and this resulted in a greatly increased interest in club work over the state.

While Arizona's percentage of increase was high, the actual number of club members completing the work in 1925 was only 735.

Boys' and Girls' club work is conducted by the Agricultural Extension Division at Gainesville, the State Home Demonstration Department at Tallahassee, and the county and home demonstration agents in the counties.

THE CITRUS INDUSTRY POOR FORESTS RESULT FROM BURNING WOODS

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This absence of thrifty young pines which should have grown in the Southern coastal plain states is a loss many times as great as the people of the same states have paid for taxes in all the twenty-five years.

Nature will speedily restock most of the cut-over lands, if fires are kept out.—Pine Inst. of America.

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August, 1926.

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WHITE WYANDOTT Cockerels, regal strain—the best in the country, direct from Martin pens. Utility and show birds \$5.00 each; also eggs for hatching \$5.00 per 15. W. A. King, Gen. Del., St. Petersburg, Florida.

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